Managing the Hospitalized Patient on Insulin: Care Transition

Catie Prinzing
MSN, APRN, CNS

Diabetes and Hospitalization

- People with DM are hospitalized 3x more frequently than patients without diabetes
- Hyperglycemia in hospitalized patients is associated with poor clinical outcomes
- Severe hypoglycemia (≤50) associated with poor clinical outcomes
- Insulin therapy is the preferred method of glycemic control for most hospitalized patients

Oral Medications in the Hospital Setting

- Oral medications for diabetes not appropriate for the acute or critically ill hospitalized patient
- Oral medications **only** appropriate for patients who are stable, able to consume majority of meals at regular times and are close to discharge

Available Insulins

- Long and Intermediate
  - Lantus, Levemir, NPH
- Short Acting
  - Humulin and Novolin Regular
- Rapid Acting
  - Novolog, Humalog and Apidra
- Mixed Insulins
- Insulin U-500
  - 5x concentration of other insulins

ADA Definitions and Target Goals for Hospitalized Patients

- Hyperglycemia >140 mg/dl
- Hypoglycemia defined as ≤ 70 mg/dl.
- A1 of 6.5% upon hospitalization signifies pre-existing diabetes on admission
- Critical Care BG goals:140 to 180 mg/dl.
- Non-critical Care BG goals:
  - Pre-meal <140 mg/dl
  - Random < 180 mg/dl

Appropriate Insulin For Clinical Situation: Intensive Care

- Insulin infusion with Regular insulin
- No advantage to rapid acting insulin – more expensive
- ½ life of insulin is 5-7 minutes; biological effect 20 minutes
- Safest way to quickly gain control of hyperglycemia
- Infusion started at no greater than 180 mg/dl.
- Computerized protocols i.e. Glucomander or GlucoStabilizer or paper infusion protocols for patient safety
- Blood glucose checked hourly and titrated

Endocrine Practice Vol 17(S2) March/April 2011, pp10
Diabetes Care, Vol 36, S1, January 2013. pp S45 – S49.

Transition from Insulin Infusion to Subcutaneous Insulin

Determine Total Daily Insulin Requirements

- Two methods
  - 80% of the total insulin received past 24 hours = total daily dose
  - Weight base = total daily dose
    - 0.4 u/kg - <70 kg, renal failure, hepatic failure or malnourished
    - 0.5 u/kg – weight 70 – 100 kg
    - 0.6+ u/kg – steroid therapy, obese, wt >100 kg
- Use the smaller of the two doses

Transitioning from IV to SQ……

- Divide total daily dose into basal and bolus
  - Usually about 50% basal, 50% bolus
  - If on steroids, less basal and more bolus
- Add correction scale
- Give basal insulin 3-4 hours before discontinuing the infusion

Appropriate Insulin for Clinical Situation: Acute Care

- Discontinue all oral meds upon admission
- Basal, bolus, correction recommended
  - Lantus, Levemir, NPH
- Meal bolus
  - Novolog, Humalog, Apidra preferred
  - Insulin to carb dosing is safest for hospitalized patients
    - PO intake unpredictable in many patients
    - Less chance of stacking insulin which decreases risk of hypoglycemia
- Correction
  - Choose scale based on patient insulin sensitivity

Considerations for ALL Patients on Basal-Bolus Insulin Therapy

- Home oral diabetes meds and insulin doses
- A1C on admission
- Reason for admission and co-morbidities
- PO status
- Weight
- IV fluids and other medications
- Activity level

Other Situations

- Enteral and Parenteral Feeding
  - All patients have blood sugars routinely checked
  - Regular, Rapid Acting, long acting??
  - Is feeding continuous? Bolus?
  - Patient has diabetes? No diabetes?
  - Choice of insulin depends on situation.
- Steroids
  - PO or IV
  - Once daily, 24 hour dosing?
  - Choice of insulin depends on situation
- Renal Failure
  - Lower doses

Insulin U-500

- 5 x more potent than standard U-100 insulin
- Prescribed for patient's with extreme insulin resistance requiring large doses of insulin

Insulin U-500

- Non-modified regular insulin
- Initial effects similar to regular insulin with onset of 30 minutes and peak w/in 1-3 hours
- Pharmacokinetics similar to NPH
- High concentration results in delayed absorption
- Single dose active for 8 hrs but can last up to 24 hours

Insulin U-500: Safe Use in Hospital Setting

- Restrict U-500 to Glycemic Management Team and/or pharmacist regarding dose
- U-500 vials not dispensed to the nursing units
- Pharmacy pre-fills syringes and delivers to the nursing unit
- Drawn up in TB syringes
- Prescription written in milliliters
- Pharmacy sends education information to the unit with each dose
- Independent double check by nursing staff

Plan Ahead for Patient Discharge

- Will patient go home on insulin?
  - Determine type(s) of insulin
  - Must consider what the can patient afford
    - If changing to less expensive insulins, begin transition before discharge
  - Pens vs vial/syringe
- Will patient go home on oral medications or non-insulin injectable?
  - Begin transition when patient is stable and eating
- Does patient need diabetes education?

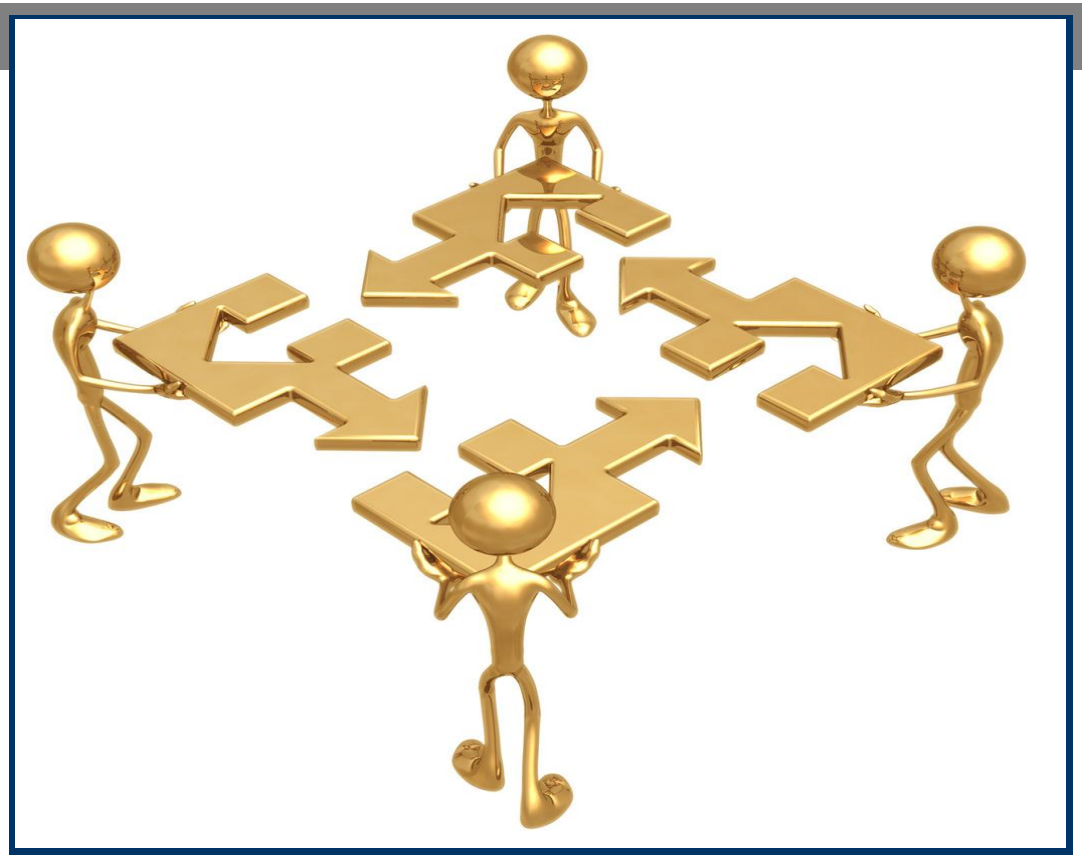
What's Coming????

- Several new rapid acting insulins under development
- Studies on use of IV GLP-1 (exenatide and liraglutide) in Type 2 patients having major surgeries and cardiac ICU patients
- Studies on use of DPP-4 inhibitors in controlling glycemia in hospitalized patients with pre-diabetes and diabetes = to 20-30 units of insulin

MOST IMPORTANT!

Each patient clinical situation viewed individually with an insulin plan developed to meet the needs and situation of that patient

Components TJC Advanced Diabetes Inpatient Program



A Multidisciplinary Team

- A multidisciplinary program team is identified with a designated team leader
- OUR Team
  - Senior Leader Champion, Bob Polk, MD
  - Endocrinology Champion, Julie Foote, MD
  - APRNs, CNO, Hospitalist, RN's- Formal and informal nursing leaders, Registered Dietitians, Pharmacist, Performance Improvement/QI, Patient Safety,Data Team Representative, Lab: POC Coordinator

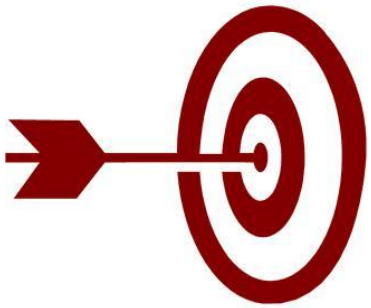
Medical Record

- All patients with diabetes are identified as having diabetes in the medical record at admission & discharge
- Documentation in the MR reflects:
  - Type of DM; home medications; weight
  - Control prior to admission & hyperglycemia on admission
  - Nutritional screening results
  - Nutrition plan and anticipated nutritional status
  - Comprehension & competence of diabetes self-management activities

Glycemic Target Ranges

Blood Glucose Targets

- SARMC
  - 100 to 150 mg/dl before meals and fasting
  - Random blood glucose <180 mg/dl



A1C

- An A1C is drawn at the time of admission unless results of the patient's A1C drawn within the last 60 days are known, or the patient has a medical condition or has received therapy that would confound results

Patient Safety

- Plans for the treatment of hypoglycemia and hyperglycemia are established for each patient
  - Hypoglycemia protocol approved by Med Exec
    - ≤ 70 mg/dl for non-pregnant patients
    - < 60 for pregnant patients
- Episodes of hypoglycemia are identified & contributing reasons for these are identified and evaluated for trends

Delivering/Facilitating Clinical Care

- A plan for coordinating administration of insulin and delivery of meals
- Nutritional assessments are conducted for patients not consistently reaching glucose targets

Facilitating Care Cont . . . .

- Written protocols are developed for the management of patients on IV insulin infusions
- Written blood glucose monitoring protocols for patients with known diabetes are developed
- Results of blood glucose monitoring are available to all members of the health care team

Staff Providing Management/Care

- Staff working with patients with diabetes have education specific to the management of diabetes

Supporting Diabetes Self-Management Education

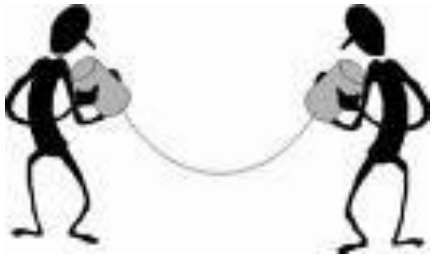
Patients with newly diagnosed diabetes or educational deficits have the following educational components reflected in the Plan of Care:

- Medication Management, Nutrition Management
- Signs/symptoms and treatment of hypo/hyperglycemia
- Blood glucose monitoring, Sick day guideline, Exercise
- Contact information at discharge for ongoing diabetes medical management and emergency situations

- Plan for post-discharge education or self-management support

Clinical Information Management

- The patient and the practitioner managing his/her diabetes care after discharge are informed about the patient's A1C results and any unresolved issues related to glucose management



SAMG Inpatient Glycemic Management Service

- Consultative service using APRNs
  - 2 Nurse Practitioners and 1 Clinical Nurse Specialist
  - Dr. Julie Foote, Medical Director
  - Service started in August 2009

Glycemic Management Service

- Assessment of patient: medical history, home diabetes management, medications & current illness
- Management of all diabetes care during patient hospitalization which includes:
  - Prescribing insulin/oral diabetes medications
  - Ongoing assessment of patient glycemic control, changing insulin requirements & titration of insulin doses
  - Assessing for educational needs and referring for diabetes education as needed to safely discharge home
  - Writing diabetes discharge orders & plan for home diabetes management
  - Referrals for outpatient diabetes education

SAMG Inpatient Diabetes Educator

- Reviews daily list of all patients with POC BGs
- Ensures all patient's admitted with DX of diabetes have A1C drawn
- Able to triage patient education based on needs and discharge plan
- Provides education to all patients newly diagnosed; new to insulin or oral meds; new to BG monitoring; admitted in DKA/HHS; diabetes complications; complicated home routine
- Easily assessable to all staff
- Communicates with practitioners
- Assists with getting referral from provider for outpatient diabetes education and support as needed

- Inpatient
  - Limited focus and retention
  - “Survival Skills”
- Outpatient

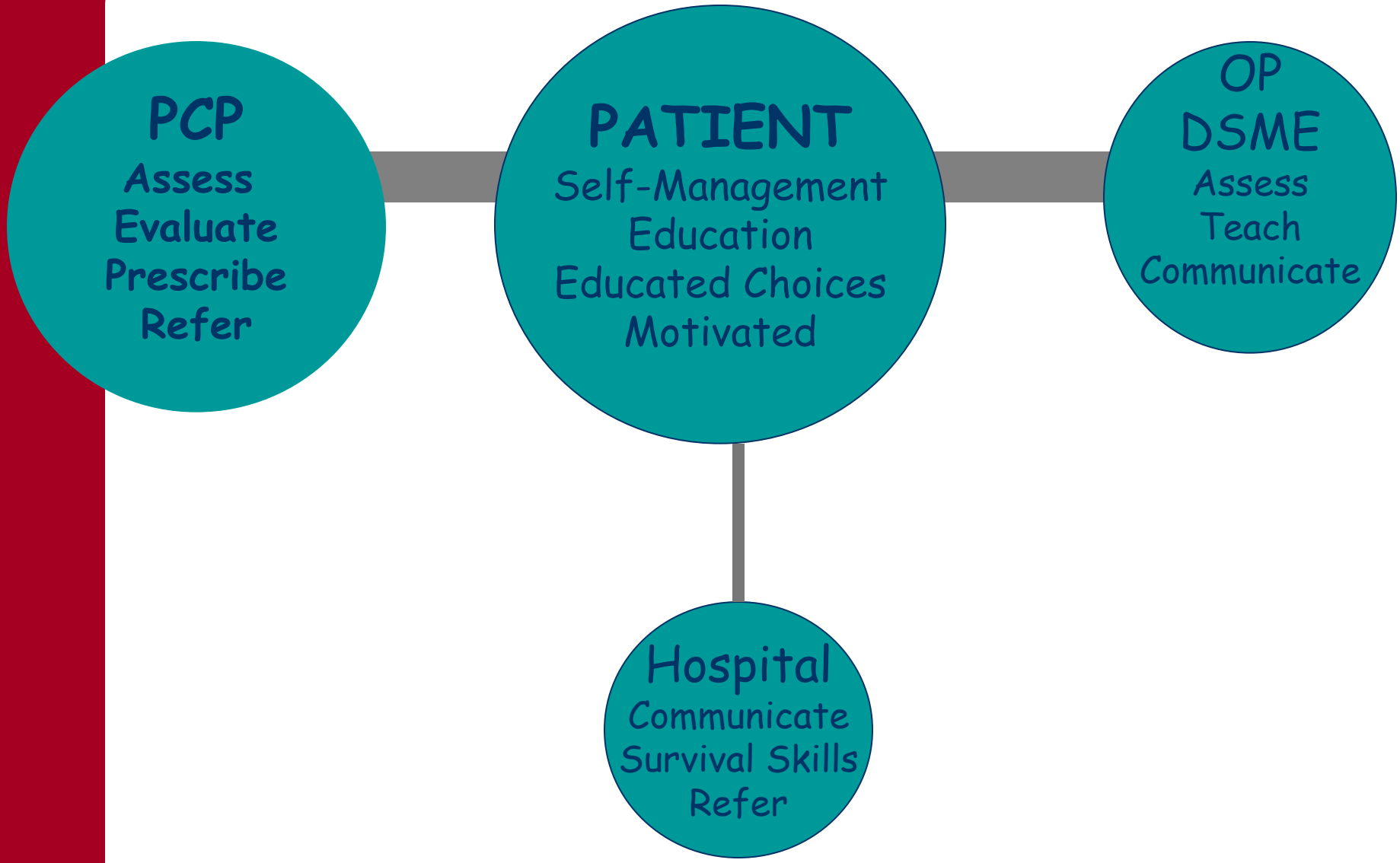
Diabetes Self-Management Education (DSME)

- Inpatient
  - Limited focus and retention
  - “Survival Skills”
  - Goal is safe discharge to home setting with continued education as needed in outpatient setting
- Outpatient
  - Helps facilitate the knowledge, skill, and ability necessary for diabetes self-management
  - Certified Diabetes Educators (CDE)

Closing the Gap:
Inpatient ⟷ Outpatient

Basic Elements

- **Patient**
  - What is the patient willing to do?
  - What are patient's resources?
- **Hospital System**
  - Following AACE/ADA inpatient guidelines for management
  - Communication between inpatient providers and PCP
  - Making referrals/recommendations for outpatient education
- **PCP**
  - Following diabetes care guidelines
  - Ongoing assessment & evaluation of treatment plan
  - Clear medication instructions
  - Referrals for Diabetes Education as appropriate
- **Diabetes Education**
  - Educational services tailored to meet patient needs


PCP
Assess
Evaluate
Prescribe
Refer
PATIENT
Self-Management
Education
Educated Choices
Motivated
OP DSME
Assess
Teach
Communicate
Hospital
Communicate
Survival Skills
Refer

Outpatient Diabetes Education:
Our Changing Community

- Humphreys Diabetes Center was founded in 1987 with a generous donation from Fred Humphreys and sponsorship of SARMC
  - Began as a small department at SARMC
- In 1996, St. Lukes joined as a co-sponsor and HDC became a free-standing diabetes center

Changing Community cont . . .

- Both health systems contributed annually to subsidize HDC ($300,000 each last year)
- Increased demand for diabetes services, increased cost of operations and decreased reimbursement for diabetes education made current HDC organizational model unsustainable
- St. Luke’s assumed full sponsorship of HDC April 1, 2011

Saint Alphonsus

- Saint Alphonsus Outpatient Diabetes Care and Education Program opened on April 4, 2011

Saint Alphonsus

DIABETES CARE & EDUCATION

Two Locations to Meet Community Needs

- Saint Alphonsus Regional Medical Center
  Liberty Medical Park
  900 N Liberty, Suite 100
  Boise, ID 83704

- Saint Alphonsus Meridian Health Plaza
  3025 W. Cherry Lane
  Meridian, ID 83642

Program Staffed By….

- Certified Diabetes Educators
  - Facilitate knowledge & skills needed
  - Ongoing support & resource to patient & provider
  - Advocate
- Advanced Practice RNs
  - Clinical Nurse Specialist
  - Nurse Practitioners
  - Work with primary care provider *not* replace

Saint Alphonsus Diabetes Program Services

- DSME for type 1, type 2, gestational diabetes, and diabetes complicated by pregnancy
- Medical management of diabetes
- Foot care
- Wound care
- Insulin pump therapy

Provider Benefits of DSME

- Improved patient outcomes
- Easier and less time consuming patient management
- Resources

Saint Alphonsus Diabetes Care and Education

- Referral Process
- Collaboration
- Communication

Questions & Comments


901
999
1055
COMING SUMMER 2007
CENTER FOR ADVANCED HEALING